Secure S3 Bucket on MinIO OSS

Project Objective

- Understand **Access Control** on cloud storage
- Simulate **Threat Hunting** for restricted users
- Test **Server-Side Encryption** (limited in MinIO OSS SSO)

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As the first step, I initiated MinIO on my local environment.

```
C:\Users\Garlke\Desktop\S3>mini.exe server C:\Users\Garlke\Desktop\S3
MinIO Object Storage Server
Copyright: 2015-2025 MinIO, Inc.
License: GNU AGPLv3 - https://www.gnu.org/licenses/agpl-3.0.html
Version: RELEASE.2025-09-07T16-13-09Z (go1.24.6 windows/amd64)

API: http://192.168.1.171:9000  http://[redacted]:9000  http://127.0.0.1:9000
   RootUser: garlke
   RootPass: garlke12

WebUI: http://192.168.1.171:61355 http://[redacted]:61355 http://127.0.0.1:61355
   RootUser: garlke
   RootPass: garlke12

CLI: https://docs.min.io/community/minio-object-store/reference/minio-mc.html#quickstar
   $ mc alias set 'myminio' 'http://192.168.1.171:9000' 'garlke' 'garlke12'

Docs: https://docs.min.io
```

In the second step, I updated the username and password credentials.

```
C:\Users\Garlke\Desktop\S3>set MINIO_ROOT_PASSWORD=garlke12
```

```
C:\Users\Garlke\Desktop\S3>set MINIO_ROOT_USER=garlke
```

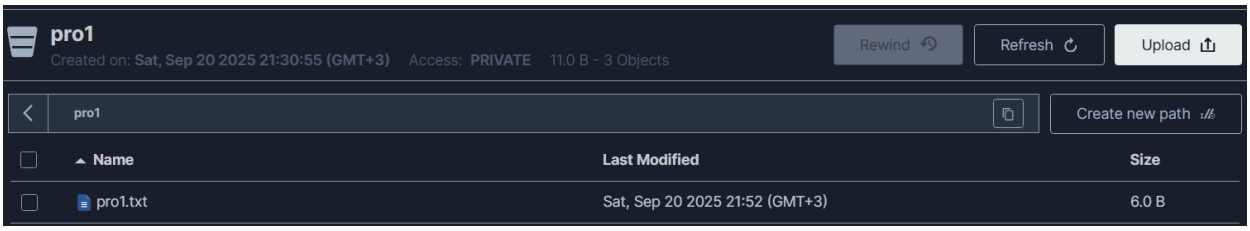
and i connected to MinIO using the MC client

```
C:\Users\Garlke\Desktop\S3>mc alias set local http://127.0.0.1:9000 garlke garlke12
Added `local` successfully.
```

Finally, I removed the setup as part of testing the process.

```
C:\Users\Garlke\Desktop\S3>mc rm C:\Users\Garlke\Desktop\S3\try.txt local/pro1
Removed `C:\Users\Garlke\Desktop\S3\try.txt`.
```

Next, I added a text file named `pro1.txt` to use for testing purposes.



Then, I created an additional text file for testing purposes.

```
C:\Users\Garlke\Desktop\S3>mc cp C:\Users\Garlke\Desktop\S3\pro1.txt local/pro1
...top\S3\pro1.txt: 6 B / 6 B [=============================================================] 554 B/s 0s
C:\Users\Garlke\Desktop\S3>mc cp C:\Users\Garlke\Desktop\S3\try.txt local/pro1
 0 B / ? [                                                                              =]
C:\Users\Garlke\Desktop\S3>mc cp C:\Users\Garlke\Desktop\S3\try.txt local/pro1
 0 B / ? [                                                                               =]
C:\Users\Garlke\Desktop\S3>mc rm C:\Users\Garlke\Desktop\S3\try.txt local/pro1
Removed `C:\Users\Garlke\Desktop\S3\try.txt`.
```

After adding the text file using the MC client in the command prompt, I created another user named `garlke2` with read-only permissions for testing purposes)

```
C:\Users\Garlke\Desktop\S3>mc admin user add local garlke2
Enter Secret Key:
Added user `garlke2` successfully.
```

After creating the second user, I defined a new policy by first creating a JSON file and then attaching it to the user through the MC client.


```
C:\Users\Garlke\Desktop\S3>mc admin policy create local readonly readonly.json
Created policy `readonly` successfully.
```

I assigned the policy to the user `garlke2`.

```
C:\Users\Garlke\Desktop\S3>mc admin policy attach local readonly --user garlke2
Attached Policies: [readonly]
To User: garlke2
```

I then listed all local users to verify the setup.

```
C:\Users\Garlke\Desktop\S3>mc admin user list local
enabled    garlke2
```

After completing these steps, I created new aliases: `adminlocal` and `readonlylocal`. I then assigned `garlke` to the `adminlocal` alias and `garlke2` to the `readonlylocal` alias

```
C:\Users\Garlke\Desktop\S3>mc alias set adminlocal http://127.0.0.1:9000 garlke garlke12
Added `adminlocal` successfully.

C:\Users\Garlke\Desktop\S3>mc alias set readonlylocal http://127.0.0.1:9000 garlke2 garlke12
Added `readonlylocal` successfully.
```

I listed all aliases using the MC client to verify the assignments.

```
readonlylocal
  URL       : http://127.0.0.1:9000
  AccessKey : garlke2
  SecretKey : garlke12
  API       : s3v4
  Path      : auto
  Src       : C:\Users\Garlke\mc\config.json
```

```
adminlocal
  URL       : http://127.0.0.1:9000
  AccessKey : garlke
  SecretKey : garlke12
  API       : s3v4
  Path      : auto
  Src       : C:\Users\Garlke\mc\config.json
```

Next, I attempted to add a text file to the S3 bucket using the `adminlocal` alias.

```
C:\Users\Garlke\Desktop\S3>mc cp C:\Users\Garlke\Desktop\S3\se.txt adminlocal/pro1
 0 B / ? [
```

Then, I attempted to remove the file using the `readonlylocal` alias. As expected, the action failed with an 'Access Denied' error, confirming the read-only permissions.

```
C:\Users\Garlke\Desktop\S3>mc rm readonlylocal/pro1/se.txt
mc: <ERROR> Failed to remove `readonlylocal/pro1/se.txt`. Access Denied.
```